

Oral hygiene instruction to arrest periodontitis in adolescents

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Summary

Effectiveness of professional tooth cleaning instruction for a small group in adolescents to arrest periodontitis was assessed. Female high school students were examined the periodontal status using CPI index. Total and maximum score were represented as the sum and the largest score of CPI scores, respectively. Twenty-six students having 10-14 of total score were selected from all students for this prophylactic program. O'Leary's PCR was recorded after 5 min brushing by themselves. Then, the students had an additional 10 min brushing. Finally, brushing was instructed using conventional brushes. This instruction was conducted at 1-week intervals for 10 weeks.

O'Leary's PCR decreased significantly from the initial examination to the final one. Both total and maximum CPI scores decreased significantly at the next year examination. Maximum periodontal pocket depth decreased significantly after the program.

Despite the fact that approximately 3% of all students received the program, smaller scores increased in all students, suggesting the effect of this program may have spread to the wider group. The brushing technique was improved by sufficient and repeated instruction and the progression of incipient periodontitis was arrested, and periodontal condition was improved. Consequently, this program may contribute to the prophylaxis of periodontitis in adolescents.

Key words: professional tooth cleaning instruction, periodontitis, adolescent, CPI.

Introduction

Since periodontitis is one of the most frequent diseases affecting not only adults but also adolescents, protection and prevention of the disease are necessary in young age. Incipient periodontitis in children may develop into adult periodontitis [1].

We have carried out the surveys of periodontitis status in adolescent students since 1983 [2-6]. No periodontitis in teenage students was below 20%, but the prevalence and severity grew up in proportion with age [5].

Bimstein [7] and Maita et al. [6] pointed out the importance of prevention, diagnosis and treatment in early stage, because the incipient periodontitis in adolescents may develop into adult periodontitis. Becker [8] et al. carried out a longitudinal survey and reported that the mean annual periodontal pocket depths per tooth and per patient varied from 0.24 mm to 2.46 mm per

year. Our periodontal examination in 2003 found out that about 18% of 1121 adolescent subjects had „calculus“. Therefore, the prevention and some periodontal treatments should be necessary in the adolescent students. School students cannot easily receive the dental care, because they have to take lessons in school, and periodontitis will tend to develop having none of clinical symptoms. Therefore, some prophylactic programs should be necessary to prevent and to arrest periodontitis in adolescents.

We examined the periodontal status of junior and high school students in Sendai city in 2002 and 2003 using CPI [9] (Community Periodontal Index, WHO). A small group of students suffering from mild periodontitis was selected from all students to subject for this prophylactic program.

The purpose was to assess the effectiveness of professional debridement instruction in a small group of adolescents, in order to arrest periodontitis.

Materials and methods

High school female students (1220 subjects in 2002, 1121 in 2003, 12 to 18 years old) were examined the periodontal status using WHO periodontal probe (YDM Corp., Tokyo). Community of Periodontal Index (CPI) proposed by WHO in six index teeth was measured in each student. Total CPI score (0 to 24) represented the sum of CPI score for six index teeth in each student. The largest score of index teeth was represented as the maximum score for six index teeth in each student. We selected 26 students with 10-14 of total CPI score, as having mild periodontitis for this prophylactic program. This program was carried out with the permission of Health Committee of the school and the consents of the students.

Professional tooth cleaning instruction program

In order to assess the effectiveness of this prophylactic program, periodontal pocket depth of each index teeth was measured using a periodontal pocket probe (Nordent, USA) before starting this program.

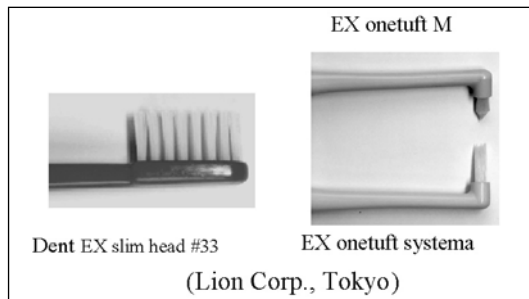


Figure 1. Brushes used in professional tooth cleaning instruction



Figure 2. Scene of oral examination and professional tooth cleaning instruction

The participants in this program were given conventional brushes that were Dent EX slim head #33[®] and one-tuft M[®] (Lion Corp., Tokyo) shown in *Figure 1*. O'Leary PCR recorded cervical and proximal plaque, by staining with Prospec[®] (GC Corp, Tokyo) after 5 min of brushing by themselves. Each examiner of the four dentists of our department checked the residual plaque and pointed out the sites using hand mirror. Students were subjected to an additional 10 min of brushing by themselves. Each student was checked out the residual cervical and proximal plaque, and was instructed regarding the technique of removing the residual plaque. Brushing instruction was professionally carried out using a brush and an one tuft brush, based upon Scrubbing method, until the residual plaque was completely removed. Brushing instruction and the scenes are shown in *Figure 2*. Scaling was carried out with an ultra-sonic scaler, Varios[®], (Nakanishi, Kanuma) when supragingival calculus was found out. This instruction program was conducted at 1-week intervals for 10 weeks, on lunchtime, without causing an inconvenience to school lessons.

Statistic analysis

Change of O'Leary PCR was compared between the mean of initial levels and the final levels of the program, with Student t-test. The change in total and maximum CPI scores was compared with the mean score of 2002 and 2003, using student t-test. Change of mean and maximum periodontal pocket depth were compared with the mean levels between, before and after the program, with Student t-test. Each CPI score in both years was analyzed by χ^2 test.

Results

O'Leary PCR decreased significantly from the initial level of 50.1% to 13.5% finally ($p < 0.01$) according to the progress of instructions (Figure 3). It shows that the participants have acquired the correct techniques to remove the cervical and proximal plaque.

Changes of total and maximum CPI score of index teeth are shown in Figure 4. Total CPI score fell significantly down from 10.7 in 2002 to 4.9 in 2003 ($p < 0.001$). Maximum CPI score fell significantly down from 2.4 in 2002 to 1.5 in 2003 ($p < 0.001$). Changes of mean and maximum periodontal pocket depth of index teeth, before and after the program, are shown in Figure 5. Mean periodontal pocket depth decreased slightly at the final time, but no significant difference (ns) compared with the first examination

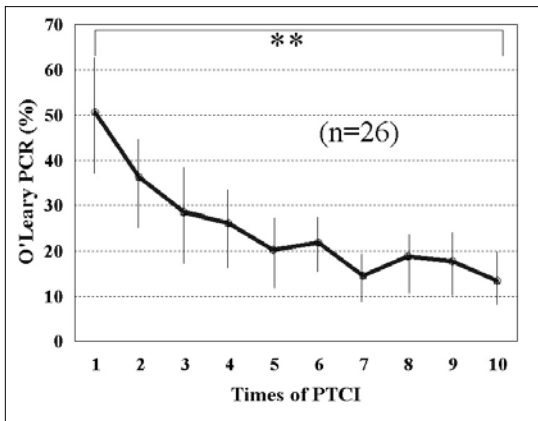


Figure 3. Change of O'Leary Plaque Control Record (PCR). Mean of PCR after ten times-instruction was compared with mean of the initial PCR level. * $p < 0.01$ (student t test)

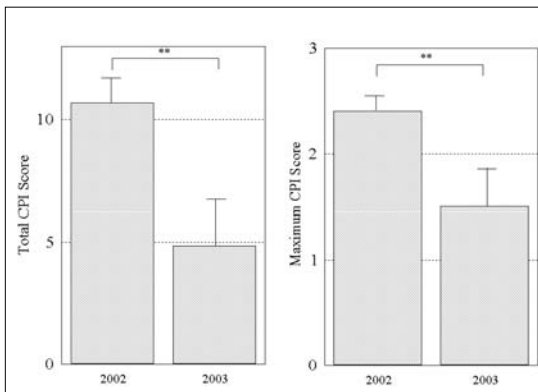


Figure 4. Change of total CPI score and maximum CPI score. Both CPI scores were compared with the former year scores. ** $p < 0.001$ (student t test)

was seen. On the other hand, the maximum periodontal pocket depth decreased 1 mm (3.4 mm to 2.4 mm) at the last examination ($p < 0.001$).

The distribution of total CPI score of all students examined in 2002 and 2003 are shown in Figure 6. Score 0 increased significantly from 24.6% in 2003 to 39.8% in 2002 ($p < 0.001$). Total CPI score of 1 and 2 in both years did not change, but Total CPI score 3 ($p < 0.05$), 4 ($p < 0.01$), 5 ($p < 0.001$) decreased in 2003. Especially the score over 6 decreased from 22.1% to 16.4% ($p < 0.001$). This result shows smaller Total CPI score, which means healthy gums or slight periodontitis, occupied dominantly.

Discussion

We have reported that the periodontal status in adolescents progressed proportionally with age

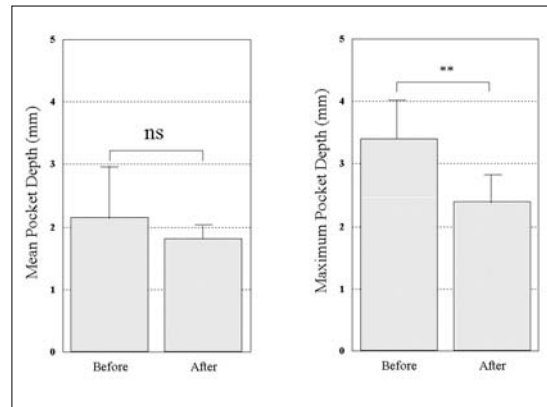


Figure 5. Change of mean periodontal pocket depth and maximum periodontal pocket depth. Both mean periodontal pocket depth and maximum periodontal pocket depth were compared between the initial level and the last level after 10-times professional tooth cleaning. ns: no significant; ** $p < 0.001$ (student t test)

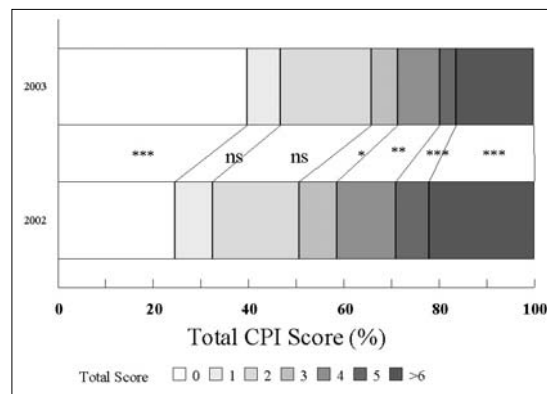


Figure 6. Change of total CPI scores. Total CPI scores of both years were compared. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (χ^2 analysis)

[10]. Consequently, we reached the conclusion that the development of periodontitis should be arrested by some prophylactic means. Therefore, we adopted a professional brushing instruction for a small group, selected from all students. The adolescents with periodontitis improved the brushing technique by adequate and repeated professional oral hygiene instruction. Alternative use of two types of brushes was very effective to remove plaque. The program contributed to the motivation for arresting periodontitis.

Maximum periodontal pocket depth became shallower at the end of this program; it suggested that the gingival swelling by inflammation might be extinguished. According to Yabuki and Okamoto [11], professional tooth cleaning was effective to acquire the motivation for oral hygiene and improved periodontal pocket depth.

Despite that only around 3% of all students received the prophylactic program, the periodontal status of the mother group tended to improve at the next year examination. Therefore, this program's effect on the small group may have spread

to the wider group. Yabuki and Okamoto [11] also reported the same results.

Since this program was carried out during lunchtime, many students came together to the sanitary room. The oral hygiene scene might arouse their interests for oral hygiene, and some of them wanted to receive the program. That would be the reason why the mother group improved the periodontal status (CPI scores) at the next year examination. Two teachers participated in this program, and they recognized the effectiveness of oral hygiene, hereafter they will be able to conduct the program without dentists.

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